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Coastal Environments, Inc, Baton Rouge, La

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For flood control and for the preservation and enhancement of environmental quality of overflow swamp habitats, introduction of sediment from the Atchafalaya Basin Main Channel into backwater areas of the Atchafalaya Basin Floodway should be minimized. This introduction occurs mainly through diversion of Main Channel discharge into the old Atchafalaya River Channel and the four dredged and maintained cross-basin channels that function as distributaries. Therefore, reduction of sedimentation requires structural control over the volume of flow diverted. A boat-traffic survey was conducted to evaluate the need for control structures with regard to navigational use of the West and East Freshwater Distribution Channels and the West and East Access Channels. The survey shows that the highest number of traffic occurrences relates to recreation and involves only small boats. The second most frequent usage is for commercial fishing with use of the East Access Channel being heaviest. Usage by the oil and gas extraction industry ranks third. Survey data suggest that only oil- and gas-related traffic requires, at low river stage, the channel dimensions presently maintained. In order of importance to navigation, the East and West Access Channels rank highest. The East Freshwater Distribution Channel has by far the least number of traffic occurrences.

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SURVEY OF CROSS-BASIN BOAT TRAFFIC ATCHAFALAYA BASIN, LOUISIANA

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FOREWORD

Protection of the environment requires effective regulatory actions which are based on sound technical and scientific information. This information must include the quantitative description and linking of pollutant sources, transport mechanisms, interactions, and resulting effects on man and his environment. Because of the complexities involved, assessment of specific pollutants in the environment requires a total systems approach which transcends the media of air, water, and land. The Environmental Monitoring and Support Laboratory-Las Vegas contributes to the formation and enhancement of a sound integrated monitoring data base through multidisciplinary, multimedia programs designed to:

- develop and optimize systems and strategies for monitoring pollutants and their impact on the environment
- demonstrate new monitoring systems and technologies by applying them to fulfill special monitoring needs of the Agency's operating programs

This report addresses one facet in a complex system for assessing environmental quality mangement associated with flood control in the Atchafalaya Basin, Louisiana. It describes a boat-traffic survey conducted to evaluate the need for control structures in light of navigation and sedimentation in the major cross-basin channels. The U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the U.S. Department of the Interior, the State of Louisiana, special interest groups, and other interested individuals will use this information to assess the potential environmental impact of the massive channelization project proposed by the Corps. The information will also be useful to those who develop alternative land and water-quality management plans which will accommodate flood flows and maintain an acceptable level of environmental quality. Further information on this survey may be obtained from the Water and Land Quality Branch, Monitoring Operations Division.

George B. Morgan
Director
Environmental Monitoring and Support Laboratory
Las Vegas

ABSTRACT

For flood control and for the preservation and enhancement of environmental quality of overflow swamp habitats, introduction of sediment from the Atchafalaya Basin Main Channel into backwater areas of the Atchafalaya Basin Floodway should be minimized. This introduction occurs mainly through diversion of Main Channel discharge into the old Atchafalaya River Channel and the four dredged and maintained cross-basin channels that function as distributaries. Therefore, reduction of sedimentation requires structural control over the volume of flow diverted. A boat-traffic survey was conducted over the period of August 1975 to May 1976 to evaluate the feasibility of control structures with regard to navigational use of the West and East Freshwater Distribution Channels and the West and East Access Channels.

The survey shows that the highest number of traffic occurrences relates to recreation and involves only small boats (< 6 m). This recreation traffic is mainly sport fishing. The second most frequent usage is for commercial fishing with this traffic heaviest in the East Access Channel. Usage by the oil and gas extraction industry ranks third. Oil- and gas-related activities involve a small number of boats. These include a limited number of tug and barge combinations, but small crew-boats (< 9 m) dominate. Survey data suggest that only oil- and gas-related traffic requires, at low river stage, the channel dimensions presently maintained.

In order of importance to navigation, the East and West Access Channels rank highest. The East Freshwater Distribution Channel has by far the least number of traffic occurrences.

In addition to the four cross-basin channels, boat traffic on the old Atchafalaya River channel was also surveyed. Here, traffic occurrences exceed in number those of the four cross-basin channels combined. In this case, oil- and gas-related traffic dominates, while sport fishing ranks second.

The traffic data in this report can predict some of the effects on the various types of boat traffic should the upstream channel entrances be closed to navigation. The building of navigation provisions as a part of structural control measures is only one alternative to providing access to the backwater areas by boats. In this report, the need for building navigation provisions is discussed in relation to other feasible measures for linking the Main Channel and the backwater areas for boat traffic.

CONTENTS

Foreword iii
Abstract iv
Contents v
Figures vi
Tables vii
Acknowledgments viii

1. Introduction 1
2. Conclusions 4
3. Data Acquisition and Analysis 5
4. Results 9
5. Discussion 25

References 29

FIGURES

Number		Page
1-1	Location of East and West Access and Freshwater Distribution Channels and their relative importance in diversion of Atchafalaya Basin Main Channel discharge	2
3-1	Distribution of traffic surveys as related to river stage	6
4-1	Actual count distribution of traffic in the four channels surveyed during summer and fall, by type of activity . . .	11
4-2	Actual count distribution of boat type, of traffic in all four channels surveyed, during summer and fall	14
4-3	Actual count distribution of activity-related use by season for the West Freshwater Distribution Channel	17
4-4	Actual count distribution of boat types by season for the West Freshwater Distribution Channel	19
4-5	Actual count distribution by activity and season for the Atchafalaya River Main Channel	23
4-6	Actual count distribution by boat type and season for the Atchafalaya River Main Channel	24
5-1	Remaining routes for large boats if cross-basin channels are closed to navigation	27

TABLES

Number		Page
3-1	Number of traffic surveys by season, date and day of week . .	5
3-2	Parameters used for identification of traffic	7
4-1	Actual count (No.) and percentage (%) distribution of traffic by activity type during summer and fall in the four channels surveyed	10
4-2	General classification and characteristics of boat traffic in cross-basin channels	12
4-3	Actual count (No.) and percentage (%) distribution of traffic by activity type during summer and fall in the four channels surveyed	13
4-4	Actual count (No.) and percentage (%) distribution of traffic by activity and season in the West Freshwater Distribution Channel	16
4-5	Actual count (No.) and percentage (%) distribution of traffic by boat type and season for the West Freshwater Distribution Channel	18
4-6	Estimate of number of actual boats involved in traffic on the four cross-basin channels	20
4-7	Traffic distribution by activity, season, and boat type for the Atchafalaya River Main Channel	22

SECTION 1

INTRODUCTION

As part of a land and water resources study of the Atchafalaya Basin, Louisiana, undertaken jointly by the U.S. Army Corps of Engineers (USCE), U.S. Fish and Wildlife Service (FWS), and the U.S. Environmental Protection Agency (EPA), a water management study was initiated by the EPA in 1973. The main objective of that study was development of a multi-purpose surface water management plan that would recognize and retain the primary use of the Atchafalaya Basin as a floodway, but would sustain or enhance the environmental quality of the aquatic and swamp forest ecosystems that represent the second major value of the area. Furthermore, consideration needed to be given to navigation and oil and gas extraction needs and to other present and projected uses.

The initial EPA study defined process-form-environment relationships corresponding to both natural processes and man's activities within the basin (Gagliano and van Beek, 1975). Major conflicts between various uses of the area and requirements for protection and enhancement of the overflow swamps were determined with respect to the surface water regime. Most salient among these conflicts are the present incompatibility between uses of the Atchafalaya Basin Floodway for flood control and navigation and the hydrologic requirements of its overflow swamps.

Through a second study (van Beek et al., 1977), surface water needs for man's uses and the natural environment were detailed further, and a multi-use management plan was developed. The single most important aspect of the plan concerns the need for increased confinement of Atchafalaya Basin flow to the Main Channel in order to reduce sedimentation in backwater areas. Current usage of the basin is not maintaining the area's environmental integrity. Accelerated sedimentation through both natural and man-induced processes has greatly altered the former backswamp environments and initiated succession toward more terrestrial conditions, with an associated deterioration of environmental quality. These processes, while altering environmental conditions, also reduce the effectiveness of the basin as a floodway.

Presently, four major distributary channels divert both water and sediment from the main channel into backwater environments. These are the East and West Freshwater Distribution Channels and the East and West Access Channels, as shown in Figure 1-1. The map also shows their relative importance with respect to discharge on the basis of 1975-1976 surveys by the USCE, New Orleans District. Approximately 15 percent of the Atchafalaya River discharge, measured at Simmesport, is diverted through the cross-basin channels, and preliminary investigations by the USCE indicate that the associated percentage of diverted sediments is even greater.

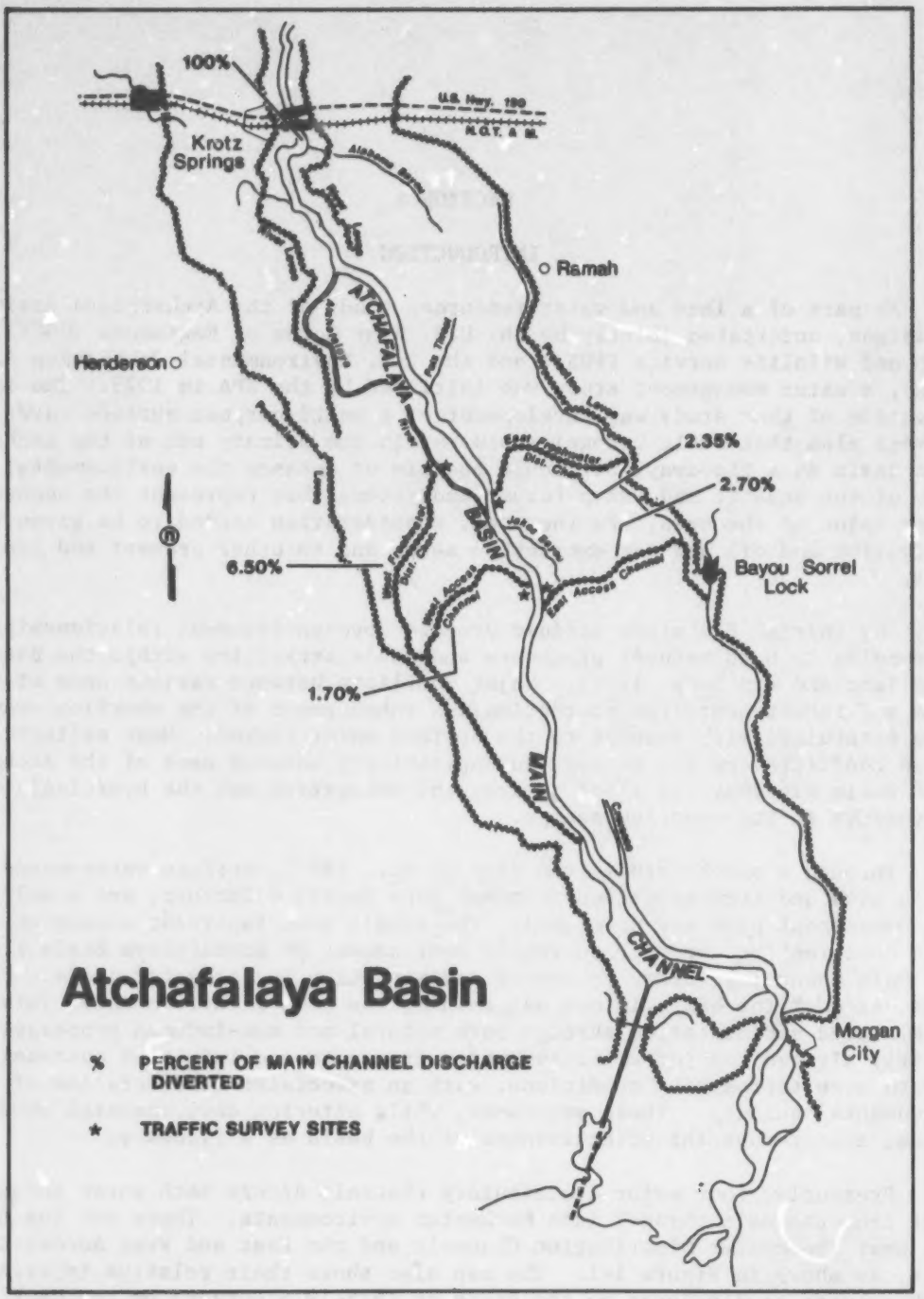

Figure 1-1. Location of East and West Access and Freshwater Distribution Channels and their relative importance in diversion of Atchafalaya Basin Main Channel discharge.

There are two reasons why diversions of water into the four distributaries should be limited to only those volumes required for maintaining environmental quality of the backwater areas. First, it is necessary for environmental quality and flood control purposes to minimize sedimentation in backwater areas. Second, limiting diversion will confine channel flow and aid in Main Channel development through river energy rather than dredging. However, implementation of structural measures to control diversion, as proposed (Gagliano and van Beek, 1975; van Beek et al., 1977), requires consideration of the navigational use that is made of these channels for various purposes.

This report presents the results of a study to delineate the use of the Access and Freshwater Distribution Channels by waterborne traffic. It was undertaken to evaluate the requirements for diversion control structures.

SECTION 2

CONCLUSIONS

Access to the Main Channel through the four cross-basin channels is utilized primarily for recreational purposes, mainly sport fishing, and involves only small boats (length < 6 m, draft < 0.6 m).

Commercial fishing traffic, limited to small boats, ranks second and mostly uses the East Access Channel.

Traffic related to the oil and gas industry represents the third largest category and is composed mainly of small crew-boats (length < 9 m, draft < 1.2 m).

Only a very limited number of large boats, all related to the oil and gas industry, appear to require dimensions to which channels are presently maintained.

Traffic on the Atchafalaya River Main Channel is twice as heavy as the four cross-basin channels combined.

Atchafalaya River Main Channel traffic relates mostly to oil and gas extraction activities.

Of the four cross-basin channels, the East and West Access Channels are the most used routes, connecting the Main Channel and backwater areas.

Navigation between the Main Channel and backwater areas would be affected least by closure of the East Freshwater Distribution Channel.

Maintenance dredging is expensive and also damages the environment. These costs may outweigh the inconvenience to boat traffic that would result from a diversion control program that does not include the building of navigation structures.

Besides the cross-basin channels, there are routes presently available that link the Main Channel and backwater areas. These routes should be evaluated as an alternative to building navigation structures associated with diversion control.

SECTION 3

DATA ACQUISITION AND ANALYSIS

To determine the present use of the Access and Freshwater Distribution Channels by waterborne traffic and the needs associated with possible control structures, traffic surveys were undertaken during the 1975-1976 water year. Boat traffic counts were made at each of the junctions of the East and West Access Channels and the East Freshwater Distribution Channel with the Atchafalaya Basin Main Channel and at the junction of the West Freshwater Distribution Channel with the Atchafalaya River. Traffic utilizing the channels relates to several different types of activity. These are commercial fishing, sport fishing, oil and gas industry exploration and extraction, hunting, and pleasure boating. Since activities were expected to be influenced on an annual basis by season and river stage, surveys were conducted as shown in TABLE 3-1 and Figure 3-1. The table further shows that in each case, counts were made over seven consecutive 24-hour periods to incorporate possible variations associated with weather and working days.

TABLE 3-1. NUMBER OF TRAFFIC SURVEYS BY SEASON, MONTH, AND DAY OF WEEK

NO.	SEASON	MONTH	FRI.	SAT.	SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.
4	Summer	August	1∂	2	3	4	5	6	7	8∂	
4	Fall	November		1∂	2	3	4	5	6	7	8∂
1*	Winter	Jan/Feb	30∂	31	1	2	3	4	5	6∂	
1*	Spring	May		1∂	2	3	4	5	6	7	8∂

* East Freshwater Distribution Channel only ∂ Half-day only

The traffic count had two specific goals. One was to determine to what type of activity traffic in each of the channels related. The other was to obtain information concerning type, size, and draft of vessels and direction, time, and day of traffic occurrences in order to evaluate navigation needs to be incorporated in diversion control. The data at each of the four locations were obtained by counting and identifying all traffic occurrences over the seven consecutive 24-hour periods. Parameters used in identification are listed in TABLE 3-2. Observations were recorded in code form in the field. Survey personnel were stationed at each location for the entire seven-day period.

TABLE 3-2. PARAMETERS USED FOR IDENTIFICATION OF TRAFFIC

1. Survey station
2. Date
3. Time
4. Day of week
5. Direction in distributary channel (in, out)
6. Direction in main channel (up, down)
7. Boat type
   a) Bateau
   b) Bass boat
   c) Small crew-boat (< 10 m)
   d) Large crew-boat (> 10 m)
   e) Tug
   f) Tug and barge
   g) Pleasure craft
   h) Other
8. Size
   a) < 6 m
   b) 6-10 m
   c) > 10 m
9. Draft
   a) < 0.6 m
   b) 0.6-1.2 m
   c) > 1.2 m
10. Number of persons
11. Activity
   a) Commercial fishing
   b) Sport fishing
   c) Oil and gas production
   d) Pleasure boating
   e) Surveying
   f) Dredging
   g) Hunting
   h) Other

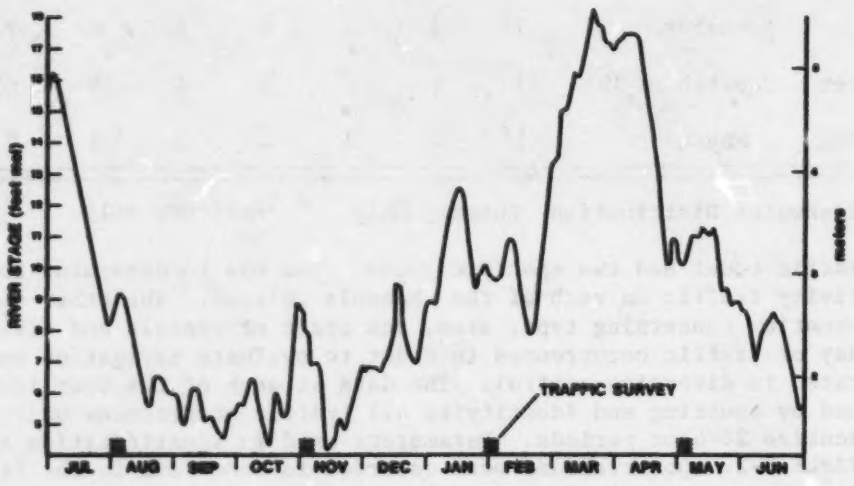

Figure 3-1. Distribution of traffic surveys as related to river stage.

Traffic data for the summer and fall periods were collected at each of the four channel junctions. Following the first two counts and examination of resulting data, it was deemed sufficient to retain only the site at the West Freshwater Distribution Channel and Atchafalaya River. This site was selected because information could be obtained simultaneously for the two channels and because it showed slightly more variation. Thus, winter and spring surveys were limited to one site.

Computer analysis of the raw field data was performed by the Statistical Analysis System (SAS). The data were sorted by the SAS program into frequency distributions by year, month, day and station; within these major subdivisions, the data were tabulated to show frequency of boat type, activity, direction of traffic, size, draft of vessel, and number of persons per boat. Additionally, traffic occurrence was tabulated to indicate peak periods of channel usage. Based on displays derived from this analysis, intensity and type of traffic were determined.

SECTION 4

RESULTS

Cross-basin navigational traffic utilizing 1) the West Freshwater Distribution Channel (WFDC), 2) the East Freshwater Distribution Channel (EFDC), 3) the West Access Channel (WAC), and 4) the East Access Channel (EAC) is engaged in four major types of activities. These are recreation (sport fishing, hunting, pleasure boating), commercial fishing, oil- and gas-related activities, and survey and dredging. TABLE 4-1 and Figure 4-1 compare activity-related use in all four channels, using summer and fall data; winter and spring data were omitted since they apply only to the EFDC. These data have been further broken down for each channel to show the traffic at each station and its composition in regard to activity.

Analysis of TABLE 4-1 and Figure 4-1 indicates that the dominant use of all cross-basin channels is recreation-oriented, constituting 33.26% of all traffic in the four channels. Nearly all recreational usage falls into the sport fishing category. On an individual channel basis, the same conclusion is reached for the WFDC, EFDC, and WAC, but does not apply to the EAC, use of which is dominated by commercial fishing. (The East Access Channel links the settlement of Bayou Sorrel at the Floodway Protection Levee with the Atchafalaya River Main Channel, which is fished especially for catfish.) The WFDC, EFDC, and WAC are used by commercial fisherman to a much lesser extent; however, commercial fishing still ranks second in channel usage.

Traffic related to oil and gas production ranks third in the total samples. However, individual channels present a different picture. Oil- and gas-related usage equals sport fishing, the largest single recreational use at that location, at the WFDC, and is dominant over commercial fishing use at the WAC. Usage is entirely related to maintenance and inspection of productive oil and gas fields in the vicinity of the channels. Most oil- and gas-related traffic occurrences involve personnel transport.

While remaining usage categories are minor in terms of number of occurrences, dredging and surveying activity deserves further comment. At present, the depth of the Access Channels is authorized to be maintained at 2.7 m below MSL. Effective water depths thus range from about 3 m to 7.5 m, depending on river stage. Of all the types of boat activity observed in this survey, only tugboats, barges, and crew boats require such depths. Therefore, surveying and dredging activities primarily support the work of oil and gas companies. Dredging and survey related traffic at the EAC and WAC is not part of the daily traffic picture because it only takes place annually or bi-annually.

TABLE 4-1. ACTUAL COUNT (NO.) AND PERCENTAGE (%) DISTRIBUTION OF TRAFFIC BY ACTIVITY TYPE DURING SUMMER AND FALL IN THE FOUR CHANNELS SURVEYED

ACTIVITY TYPE	WFDC*		EFDC∂		WAC†		EAC§		CUMULATIVE	
	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial Fishing	55	22.45	30	25.00	71	17.02	256	46.55	412	30.93
Sport Fishing	77	31.43	59	49.17	138	33.09	94	17.09	368	27.63
Oil and Gas Industry	77	31.43	0	0.00	127	30.46	82	14.91	286	21.47
Pleasure Boating	3	1.22	0	0.00	2	0.48	1	0.18	6	0.45
Surveying	0	0.00	4	3.33	6	1.44	22	4.00	32	2.40
Hunting	28	11.43	11	9.17	6	1.44	24	4.36	69	5.18
Dredge	0	0.00	0	0.00	43	10.31	56	10.18	99	7.43
Other	5	2.04	16	13.33	24	5.76	15	2.73	60	4.51
TOTAL ACTIVITY	245	100.00	120	100.00	417	100.00	550	100.00	1332	100.00

*West Freshwater Distribution Channel
∂East Freshwater Distribution Channel
†West Access Channel
§East Access Channel

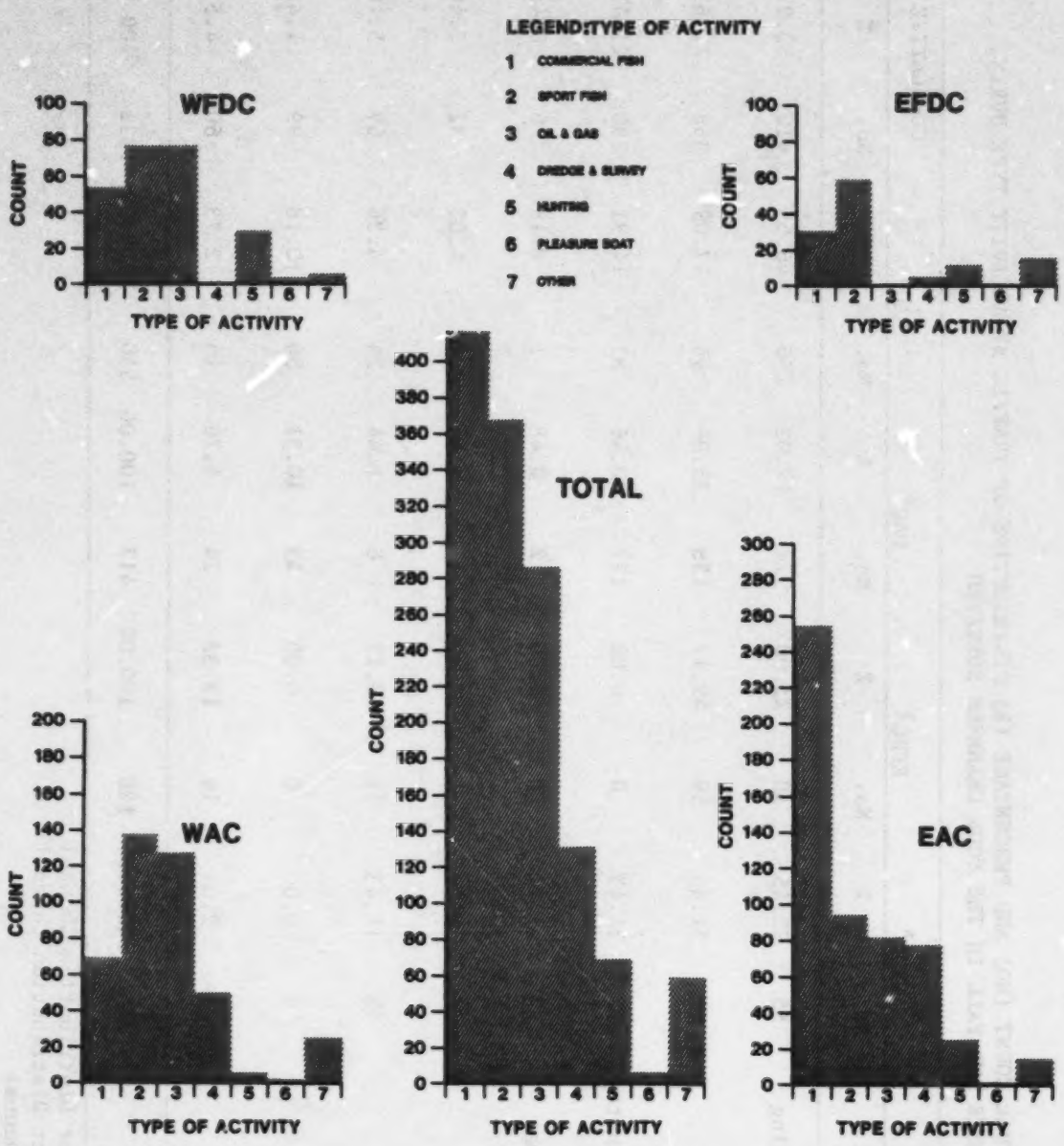

Figure 4-1. Actual count distribution of traffic in the four channels surveyed during summer and fall, by type of activity.

The above-described usage of the four cross-basin channels by various interests indicates the potential impact of channel closure or modification on traffic activities. One possible modification is control with provision for navigation. Therefore, it is important to know the draft, size, and types of craft used for activities involving the channels. Boats are classified according to their size and draft combination. TABLE 4-2 gives the size and draft limits used for each of the defined boat types.

The results of the inventory of various boat types occurring on the four channels are presented in TABLE 4-3, and graph comparisons are presented in

TABLE 4-2. GENERAL CLASSIFICATION AND CHARACTERISTICS OF BOAT TRAFFIC IN CROSS-BASIN CHANNELS

BOAT TYPE	SIZE	DRAFT
Small Boats	3 - 6 m	0 - 0.6 m
Small Crew Boats	< 9 m	0 - 0.6 m 0.6 - 1.2 m
Large Crew Boats	> 9 m	0.6 - 1.2 m > 1.2 m
Tug Boats	> 9 m	> 1.2 m
Tugs and Barges	> 9 m	> 1.2 m
Pleasure Boats	3 - 6 m	Variable

Figure 4-2. Examination of these data shows that the predominant type of boat used in the basin is the small boat. This type is less than 20 feet long, has a draft requirement of less than 2 feet, and is usually flat-bottomed and blunt-nosed. It is used for all activities within the basin, but is primarily used for commercial fishing and recreational pursuits. The small crew-boat, the second most common type using the channels, is generally less than 30 feet long and has a draft of less than 4 feet. It is used in oil- and gas-related activities and for dredging and survey activities. While the frequency of this type of craft is considerably less than the small boat type, the small crew-boat represents an important portion of the traffic utilizing these four channels.

Large crew-boats, tug boats, and tug and barge combinations in the WAC and EAC are primarily engaged in maintenance dredging of both of these channels. The majority of tug and barge occurrences is used to transport equipment necessary for dredging operations, while the remainder is related to oil and gas activities. In the WFDC, all large boat categories are related to the oil and gas industry; no such occurrences were observed at the

TABLE 4-3. ACTUAL COUNT (NO.) AND PERCENTAGE (%) DISTRIBUTION OF TRAFFIC BY BOAT TYPE DURING SUMMER AND FALL IN THE FOUR CHANNELS SURVEYED

	WFDC*		EFDC∂		WAC†		EAC§		COMBINED TOTAL	
BOAT TYPES	No.	%	No.	%	No.	%	No.	%	No.	%
Small Boats	168	68.57	114	95.00	270	64.75	429	78.00	981	73.65
Small Crew Boats	63	25.72	6	5.00	102	24.46	65	11.82	236	17.72
Large Crew Boats	4	1.63	0	0.00	4	0.96	2	0.36	10	0.75
Tug Boats	6	2.45	0	0.00	13	3.11	13	2.36	32	2.40
Tugs and Barges	4	1.63	0	0.00	26	6.24	31	5.64	61	4.58
Pleasure Boats	0	0.00	0	0.00	1	0.24	5	0.91	6	0.45
Other	0	0.00	0	0.00	1	0.24	5	0.91	6	0.45

* West Freshwater Distribution Channel
∂ East Freshwater Distribution Channel
† West Access Channel
§ East Access Channel

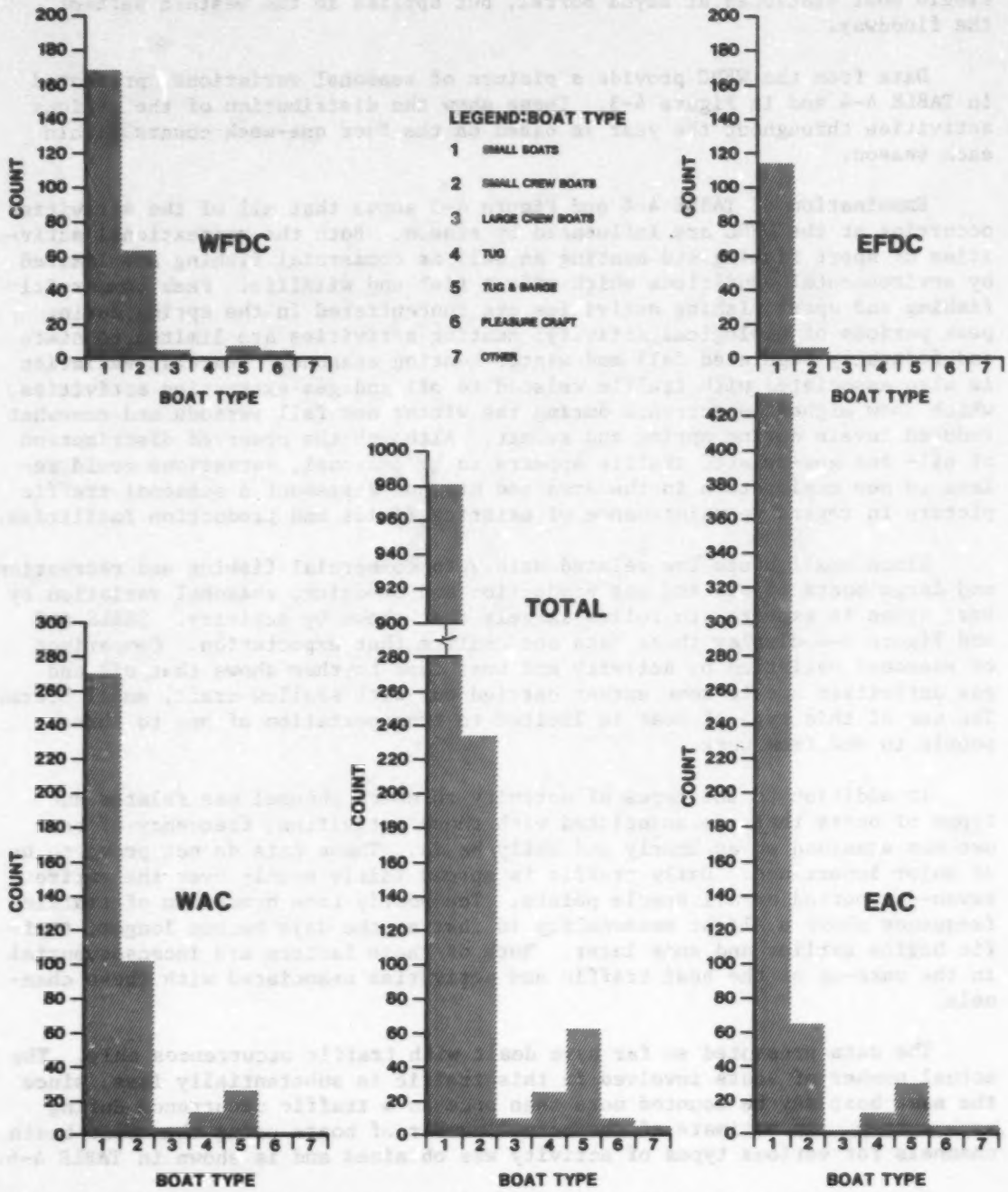

Figure 4-2. Actual count distribution by boat type, of traffic in all four channels surveyed, during summer and fall.

EFDC. Summertime tug and barge traffic in the EAC is largely related to a single boat stationed at Bayou Sorrel, but applies in the western part of the floodway.

Data from the WFDC provide a picture of seasonal variations, presented in TABLE 4-4 and in Figure 4-3. These show the distribution of the various activities throughout the year as based on the four one-week counts within each season.

Examination of TABLE 4-4 and Figure 4-3 shows that all of the activities occurring at the WFDC are influenced by season. Both the recreational activities of sport fishing and hunting as well as commercial fishing are limited by environmental conditions which affect fish and wildlife. Peak commercial fishing and sport fishing activities are concentrated in the spring during peak periods of biological activity; hunting activities are limited to state and federally regulated fall and winter hunting seasons. Seasonal variation is also associated with traffic related to oil and gas extraction activities, which show highest occurrence during the winter and fall periods and somewhat reduced levels during spring and summer. Although the observed distribution of oil- and gas-related traffic appears to be seasonal, variations could relate to new exploration in the area and may not represent a seasonal traffic picture in regard to maintenance of existing fields and production facilities.

Since small boats are related mainly to commercial fishing and recreation and large boats to oil and gas production and dredging, seasonal variation by boat types is expected to follow largely that shown by activity. TABLE 4-5 and Figure 4-4 display these data and confirm that expectation. Comparison of seasonal variation by activity and boat type further shows that oil and gas activities are to some extent carried out with shallow-draft, small boats. The use of this type of boat is limited to transportation of one to three people to and from work.

In addition to the types of activity to which channel use relates and types of boats that are associated with those activities, frequency of boat use was examined on an hourly and daily basis. These data do not prove to be of major importance. Daily traffic is spread fairly evenly over the entire seven-day period at all sample points. The hourly time breakdown of traffic frequency shows a slight seasonality in that as the days became longer, traffic begins earlier and ends later. Both of these factors are inconsequential in the make-up of the boat traffic and activities associated with these channels.

The data presented so far have dealt with traffic occurrences only. The actual number of boats involved in this traffic is substantially less, since the same boat may be counted more than once as a traffic occurrence during each survey. An estimate of the actual number of boats using the cross-basin channels for various types of activity was obtained and is shown in TABLE 4-6.

Field observations showed that, on all channels, inbound traffic equaled outbound traffic and involved the same boats. Therefore, to obtain the number of boats, all traffic counts should first be halved. The number is further reduced because in most instances traffic related to commercial fishing

TABLE 4-4. ACTUAL COUNT (NO.) AND PERCENTAGE (%) DISTRIBUTION OF TRAFFIC BY ACTIVITY AND SEASON IN THE WEST FRESHWATER DISTRIBUTION CHANNEL

ACTIVITY	WINTER		SPRING		SUMMER		FALL		COMBINED TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial Fishing	7	7.61	18	13.95	50	37.59	5	4.46	80	17.17
Sport Fishing	34	36.95	76	58.92	53	39.85	24	21.43	187	40.13
Oil and Gas Industry	50	54.35	30	23.26	27	20.30	50	44.64	157	33.69
Boating	0	0.00	1	0.77	0	0.00	3	2.68	4	0.86
Surveying	1	1.09	0	0.00	0	0.00	0	0.00	1	0.21
Hunting	0	0.00	0	0.00	0	0.00	28	25.00	28	6.01
Unknown	0	0.00	4	3.10	3	2.26	2	1.79	9	1.93

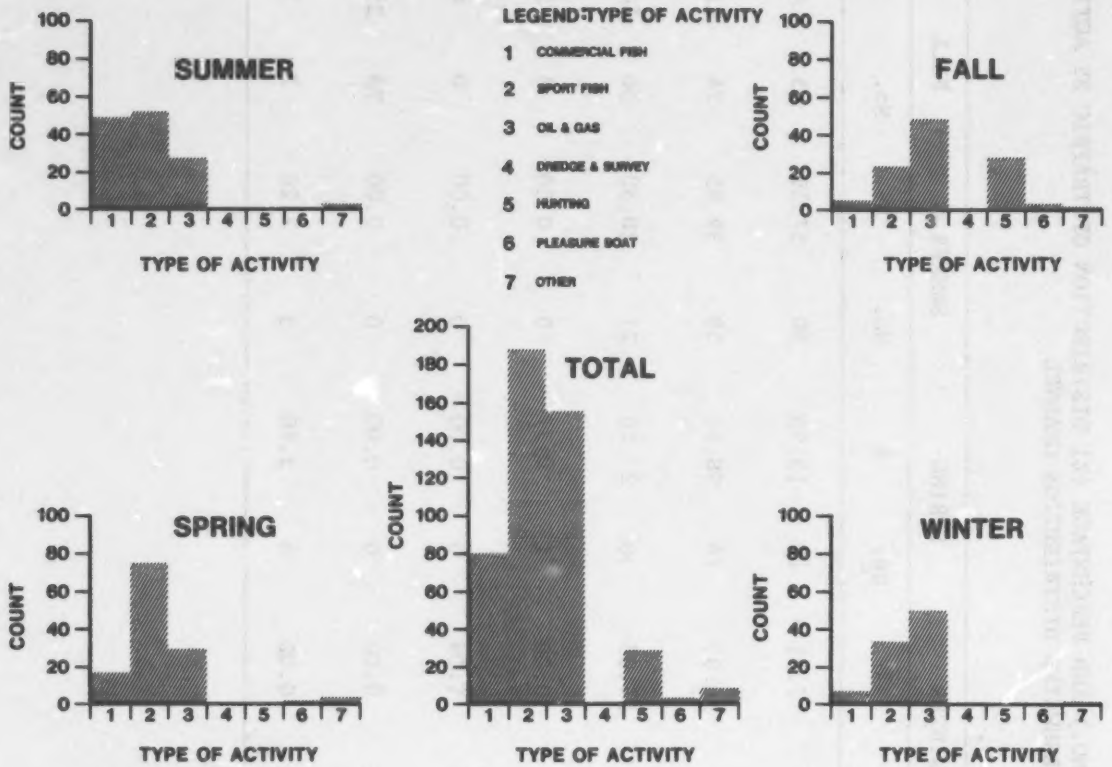

Figure 4-3. Actual count distribution of activity-related use by season for the West Freshwater Distribution Channel.

TABLE 4-5. ACTUAL COUNT (NO.) AND PERCENTAGE (%) DISTRIBUTION OF TRAFFIC BY BOAT TYPE AND SEASON FOR THE WEST FRESHWATER DISTRIBUTION CHANNEL

BOAT TYPES	WINTER		SPRING		SUMMER		FALL		COMBINED TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Small Boats	61	66.30	100	72.52	106	79.70	62	55.36	329	70.60
Small Crew Boats	31	33.70	25	19.38	21	15.79	42	37.50	119	25.54
Large Crew Boats	0	0.00	1	0.78	4	3.01	0	0.00	5	1.07
Tug Boats	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Tugs and Barges	0	0.00	3	2.32	2	1.50	4	3.57	9	1.93
Pleasure Boats	0	0.00	0	0.00	0	0.00	4	3.57	4	0.86
Other	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

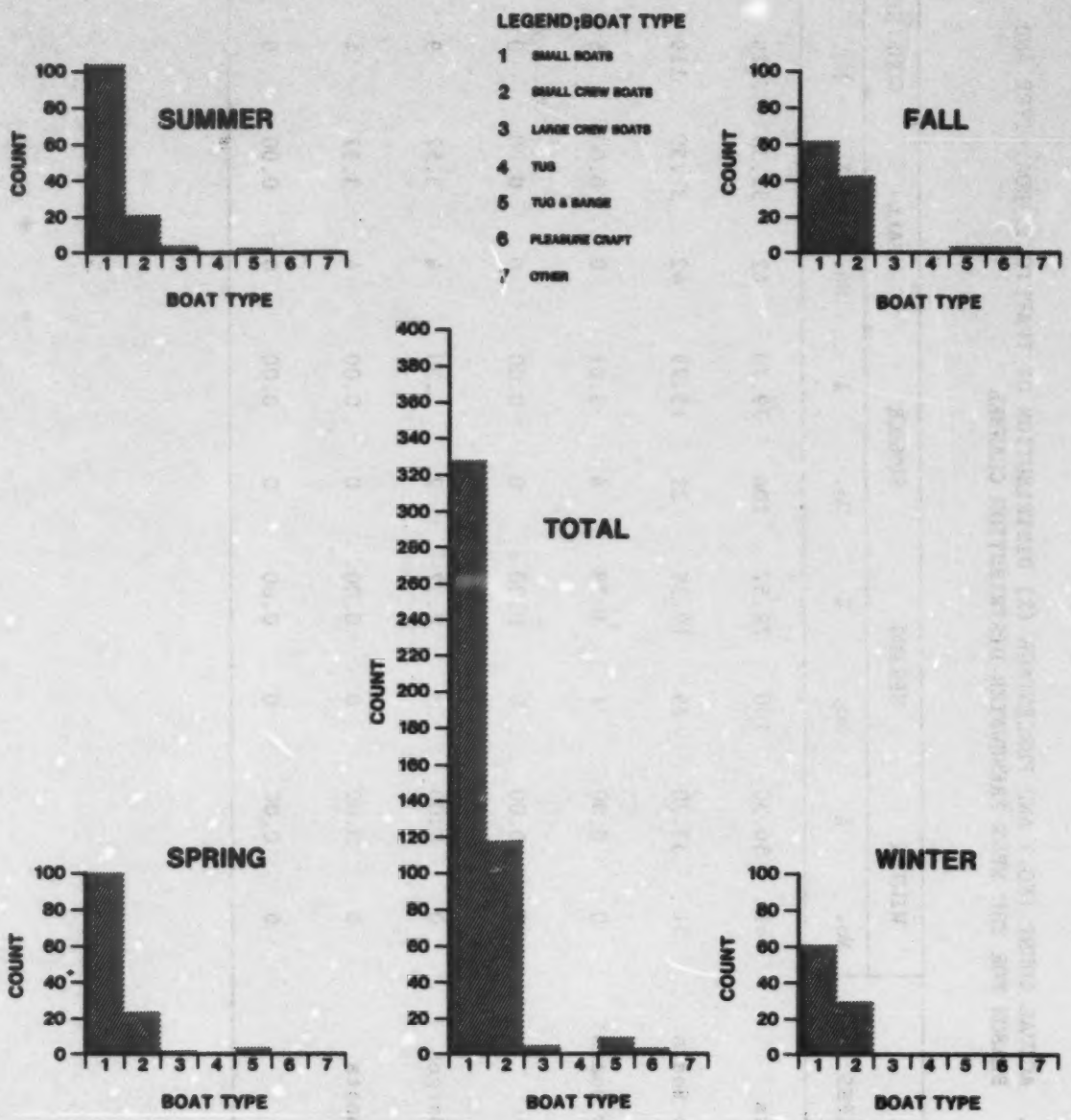

Figure 4-4. Actual count distribution of boat types by season for the West Freshwater Distribution Channel.

and oil- and gas-related personnel transport is part of a daily work routine, so that those boats are re-counted during every day of the traffic survey. Traffic counts related to these two activity types should therefore be divided also by the number of survey days.

To obtain the number of boats on an annual basis, traffic counts for the East and West Access Channels and the East Freshwater Distribution Channel must be extrapolated using the seasonal distribution shown by traffic data from the West Freshwater Distribution Channel where counts were obtained during each of the four seasons.

For example, the number of traffic counts related to commercial fishing for the East Access Channel was 256 in 14 days of counting during summer and fall. Starting with the seasonal distribution of commercial fishing counts for the West Freshwater Distribution Channel, the total count for 28 days extending over all four seasons would have been 256 + 25/55 x 256 = 372 (in the WFDC, 25 counts occurred in spring and winter and 55 counts in summer and fall). Assuming that boats are counted twice each day during the 28 days of the survey, the number of boats per day estimated to be involved in commercial fishing and to be making use of the East Access Channel connection with the Main Channel is therefore 372 ÷ 2 ÷ 28 = 7. The same reasoning is likely to apply to most instances of oil- and gas-related traffic.

An estimate of the number of recreation-related boats is more difficult to obtain. While each of those boats was also counted twice, the frequency with which the same sport fishing or hunting boat uses the same channel is unknown. The assumption made to obtain the number of recreation-related boats is that each of those boats uses the same channel once a month. If this estimate is too frequent, the number of recreation-related boats would be higher accordingly.

TABLE 4-6. ESTIMATE OF NUMBER OF ACTUAL BOATS INVOLVED IN TRAFFIC ON THE FOUR CROSS-BASIN CHANNELS

ACTIVITY	WEST FRESHWATER DISTRIBUTION CHANNEL	EAST FRESHWATER DISTRIBUTION CHANNEL	WEST ACCESS CHANNEL	EAST ACCESS CHANNEL	TOTAL
Commercial Fishing	2	1	2	7	12
Recreation	117	85	184	137	523
Oil and Gas	3	-	5	3	11
Total	122	86	191	147	546

The survey of the four cross-basin channels also presented an opportunity to assess traffic at the junction of the Atchafalaya River with the West Freshwater Distribution Channel. The Atchafalaya River, which parallels

the Main Channel (Figure 1-1), diverts approximately 30 percent of the Main Channel flow. Only about half of this flow is returned when the Atchafalaya River joins the Main Channel again; the other half feeds the West Freshwater Distribution Channel and other lesser channels, while some water may be lost through overbank flows. The Atchafalaya River is the main source of water for annual freshwater flooding of the Henderson sub-basin located west of Butte La Rose. Proposed control over diversion of water through the Atchafalaya River as part of a water management plan was discussed in an earlier report (van Beek et al., 1977).

Atchafalaya River traffic counts include only traffic moving up and down that channel past its junction with the West Freshwater Distribution Channel. The survey period and frequency were the same as for the West Freshwater Distribution Channel. The results are shown in TABLE 4-7, Figure 4-5, and Figure 4-6.

Comparison of the above tables and graphs with those for the cross-basin channels reveals that there are twice as many traffic occurrences compared to the other four channels combined. A number of conditions contribute to this heavy usage. These are a major oil and gas operation along the Atchafalaya River channel south of its junction with the WFDC, the development of new well locations between the traffic survey site and Butte La Rose, and a dredging operation upstream from the survey site. These operations mean a daily movement of personnel, equipment, and materials from Butte La Rose to the existing oil field and movement mainly of heavy earthmoving equipment upstream from the Main Channel to new well locations and the dredging operation. It was not possible to estimate to what extent traffic utilized the connection between the Atchafalaya River and the Main Channel. The tables and graphs thus represent only a picture of traffic utilizing the Atchafalaya River channel.

TABLE 4-7 and Figure 4-5 show that oil- and gas-related activities account for 60 percent of the traffic occurrences. Comparison of Figures 4-5 and 4-6 reveals also that this activity accounts for most large and small crew boats, tugs, and tug-barge combinations plus a significant number of small boats. Dredging operations involve a low number of small crew boats and some barges.

Traffic related to commercial and sport fishing is light when compared to both oil- and gas-related traffic in the Atchafalaya River and similar traffic in the four other channels. The same is true for the other recreational categories. The extent to which commercial fishing and recreational traffic moves beyond the Atchafalaya River into the Main Channel is unknown. Again, the number of boats involved is small when taking into account the previously mentioned consideration regarding multiple counts. Commercial fishing boats would be in the order of two or three, and recreational boats about 120. Assuming a daily work routine for all oil- and gas-related traffic gives a total of ten boats related to that activity.

TABLE 4-7. TRAFFIC DISTRIBUTION BY ACTIVITY, SEASON, AND BOAT TYPE FOR THE ATCHAFALAYA RIVER MAIN CHANNEL

ACTIVITY	TOTAL		WINTER		SPRING		SUMMER		FALL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial Fishing	53	6.18	9	4.09	19	8.84	14	5.02	11	7.64
Sport Fishing	210	24.48	44	20.00	97	45.11	48	17.20	21	14.38
Oil and Gas	516	60.14	136	61.82	81	37.67	211	75.63	88	61.11
Dredge and Survey	32	3.78	25	11.36	3	1.40	0	0	4	2.78
Hunting	17	1.98	0	0	0	0	0	0	17	11.81
Pleasure Boating	12	1.40	5	2.27	5	2.33	0	0	2	1.39
Other	18	2.09	1	0.46	10	4.63	6	2.15	1	0.69

BOAT TYPE	TOTAL		WINTER		SPRING		SUMMER		FALL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Small Boat	362	42.19	96	43.64	135	62.79	82	29.39	49	34.03
Small Crew Boat	202	23.54	84	38.18	27	12.50	43	15.41	48	33.33
Large Crew Boat	125	14.57	0	0	21	9.77	100	35.00	4	2.78
Tug	8	0.93	0	0	1	0.46	3	1.08	4	2.75
Tug and Barge	144	16.78	40	18.18	31	14.42	50	17.92	23	15.97
Pleasure Boat	17	1.98	0	0	0	0	1	0.36	16	11.11
Other	0	0	0	0	0	0	0	0	0	0

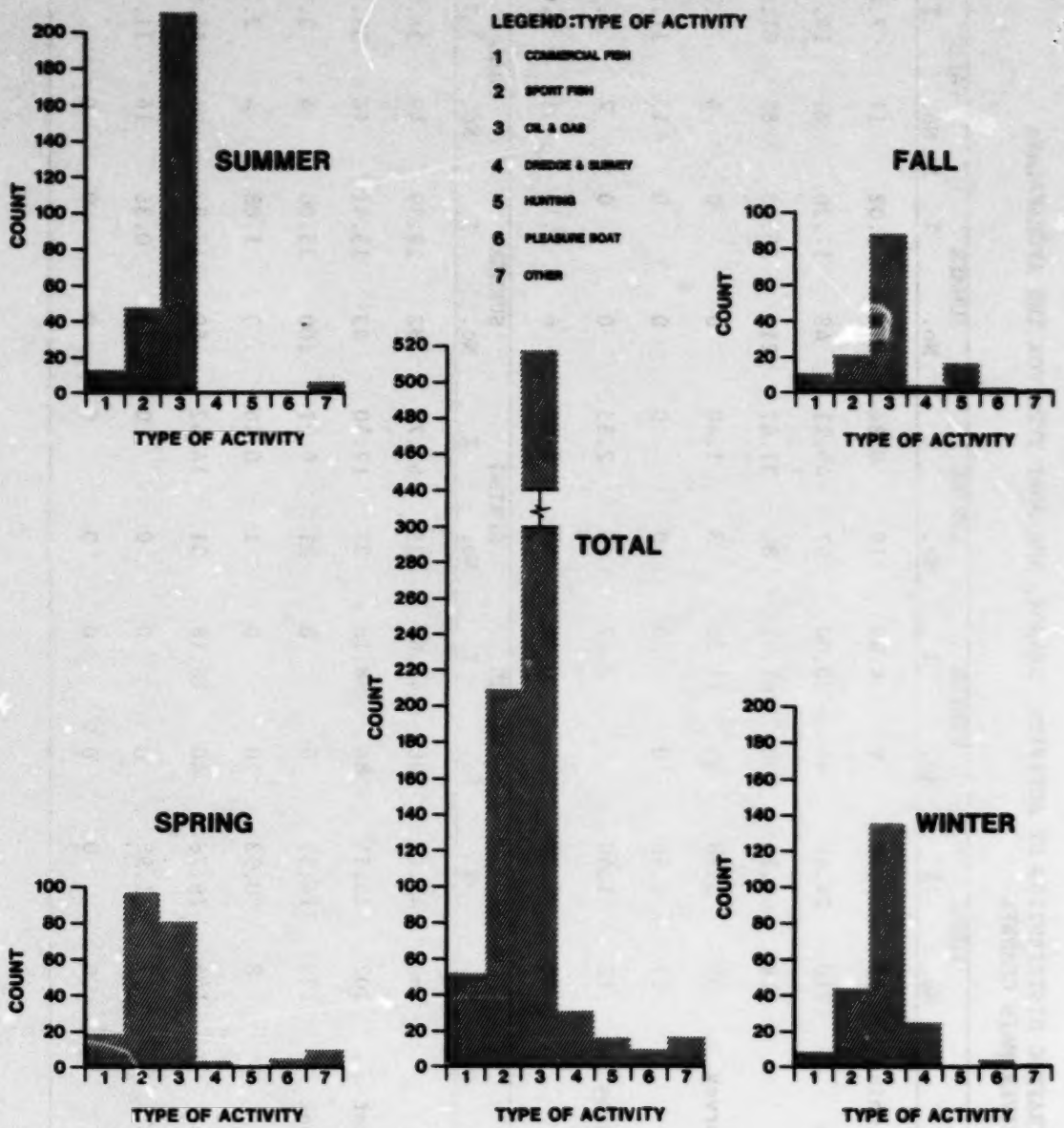

Figure 4-5. Actual count distribution by activity and season for the Atchafalaya River Main Channel.

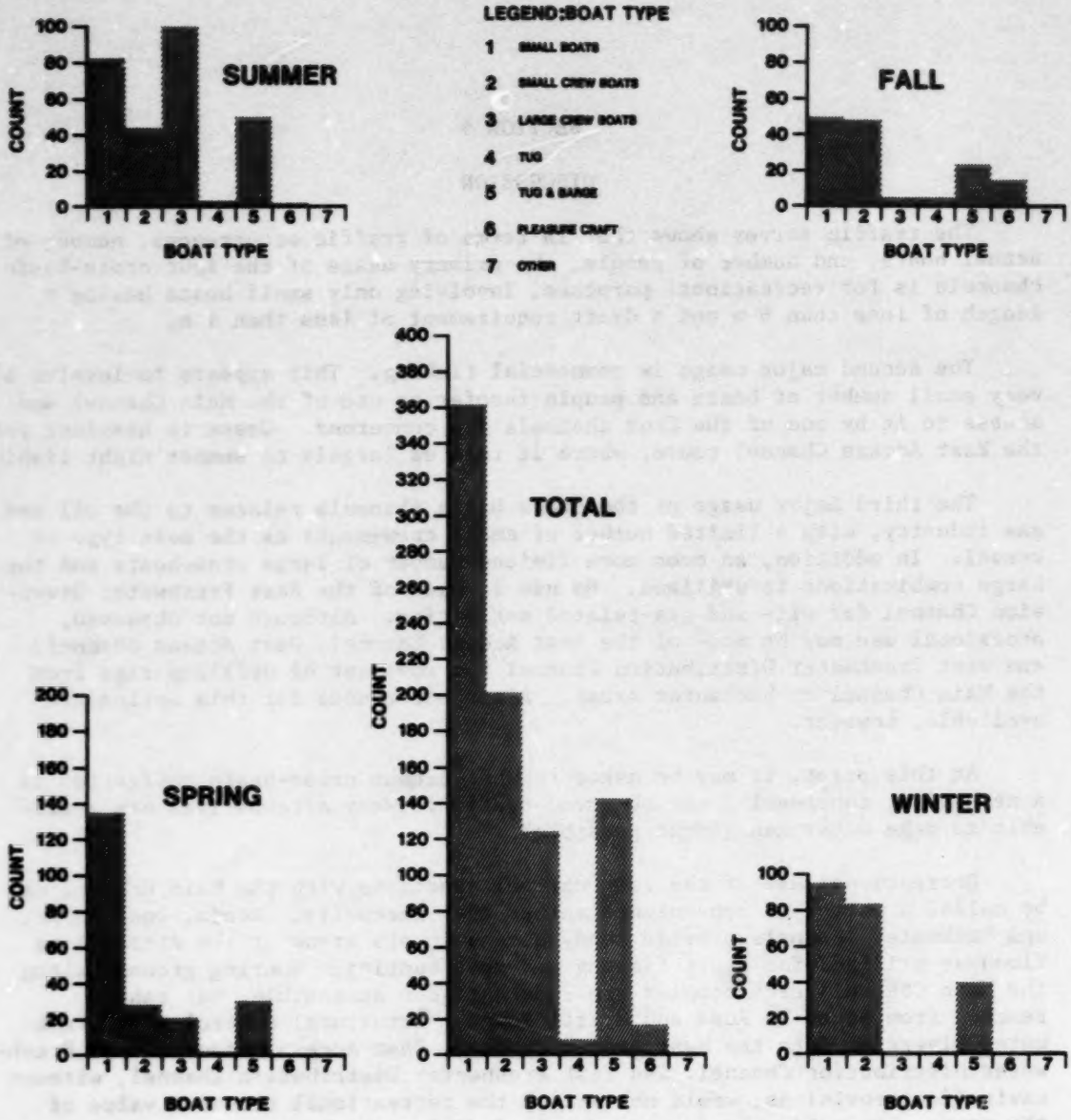

Figure 4-6. Actual count distribution by boat type and season for the Atchafalaya River Main Channel.

SECTION 5

DISCUSSION

The traffic survey shows that in terms of traffic occurrences, number of actual boats, and number of people, the primary usage of the four cross-basin channels is for recreational purposes, involving only small boats having a length of less than 6 m and a draft requirement of less than 1 m.

The second major usage is commercial fishing. This appears to involve a very small number of boats and people insofar as use of the Main Channel and access to it by one of the four channels are concerned. Usage is heaviest for the East Access Channel route, where it relates largely to summer night fishing.

The third major usage of the cross-basin channels relates to the oil and gas industry, with a limited number of small crewboats as the main type of vessel. In addition, an even more limited number of large crewboats and tug-barge combinations is utilized. No use is made of the East Freshwater Diversion Channel for oil- and gas-related activities. Although not observed, occasional use may be made of the East Access Channel, West Access Channel, and West Freshwater Distribution Channel for movement of drilling rigs from the Main Channel to backwater areas. Alternate routes for this action are available, however.

At this point, it may be asked to what extent cross-basin navigation is a necessity, considering the observed traffic. What alternatives are available to make water management possible?

Recreational use of the four channel junctions with the Main Channel may be called a matter of convenience rather than necessity. Roads, boat ramps, and backwater channels provide ready access to all areas of the Atchafalaya Floodway utilized for sport fishing and most hunting. Hunting grounds along the Main Channel levee complex are somewhat less accessible, but can be reached from Butte La Rose and Myette Point. Structural control over freshwater diversion into the West Access Channel, East Access Channel, West Freshwater Distribution Channel, and East Freshwater Distribution Channel, without navigation provisions, would not affect the recreational resource value of the area. It would only force an early decision on the part of the sport fisherman or hunter whether to try his luck in the western or the eastern half of a 60-square-mile area. The size of the cross-basin channels is clearly far in excess of recreational needs.

Commercial fishing would be adversely affected by structural controls without navigation provisions. On the west side, such action would be partially offset by access to the Main Channel from Butte La Rose and Myette

Point. This would increase maximum travel distance by about 30 km. No alternative access points are present along the east side. Minimizing impact on commercial fishing would require provision in the structural controls for small boat passage. The cost of such a provision should be weighed against compensatory payments for lost income or other mitigation programs, especially since there is a small number of persons involved. As with sport fishing, the size of the channels is clearly in excess of commercial fishing usage and needs.

Closure of the four channels to cross-basin navigation would clearly have the greatest impact on oil- and gas-related traffic at the West Freshwater Distribution Channel. The traffic survey did not, however, show an absolute need for such cross-basin traffic. It did, on the other hand, suggest that the frequent and high-cost dredging and maintenance of large channels and the associated detrimental deposition of spoil are solely, or nearly so, in support of mineral extraction. This means that costs of alternative provisions for the oil and gas industry should be weighed not only against the environmental quality benefits derived from structural control of diversion, but also against those cost benefits derived through reduced dredging and maintenance needs.

Provision of navigation locks that allow crew boat and barge passage would be an extremely costly action, particularly when considering the very small number of boats involved. Traffic certainly would not warrant four such structures. In case such structures were decided upon, however, the obvious choice on the basis of traffic occurrences would be the East and West Access Channels. Combined with existing backwater routes, these navigation locks would maintain access to all areas presently served by the four channels while also providing for cross-basin navigation.

Closure to navigation of all four channels would not necessarily limit oil- and gas-related activities. Feasible solutions to such a constraint are available in view of existing navigation routes within the East and West Floodway segments. Considering the small number and types of boats involved in the daily work routine, the stationing of a single tug-barge combination and a number of small crew boats in both the East and West Floodway segments could well be a more economical solution than provision of navigation locks and high-cost channel maintenance. Requirements of additional support traffic on an incidental basis could still be met via the Alternate Route of the Intracoastal Waterway within the eastern half of the floodway and Borrow Pit - Fausse Point Cut combination in the western half. Both routes connect with the lower reach of the Main Channel. Navigation routes available for large boats should the four channel entrances be closed to traffic are shown in Figure 5-1.

Much more difficult to evaluate are the effects related to closure of the Main Channel - Atchafalaya River connection to navigation. The difficulty arises from the fact that only in-channel traffic was surveyed under the limited scope of this study. Considerations related to sport and commercial fishing, and to some extent oil and gas operation are, nevertheless, the same as for the four cross-basin channels. There remains, however, a need for access to the Main Channel, especially if access were eliminated through clo-

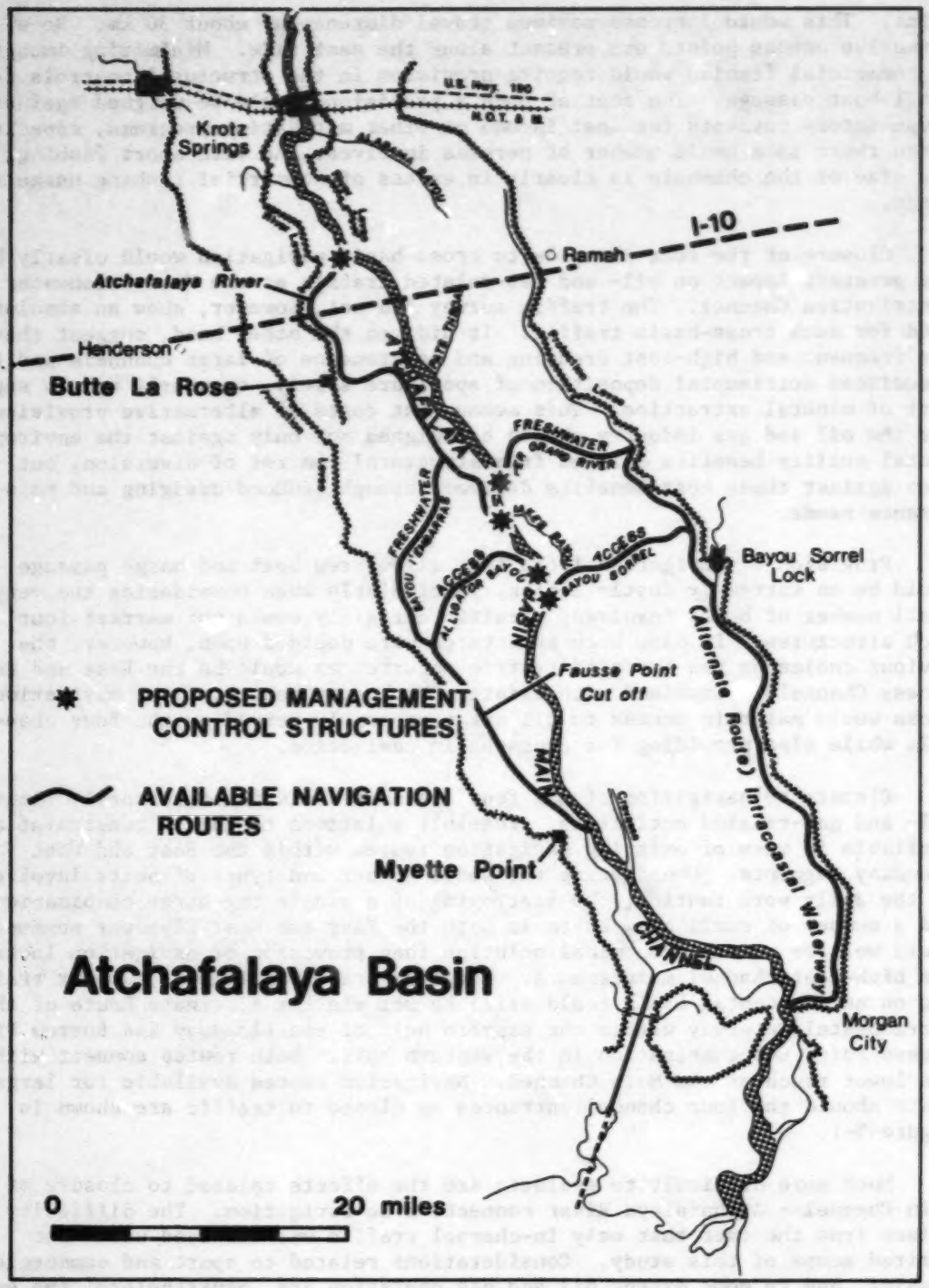

Figure 5-1. Remaining routes for large boats if cross-basin channels are closed to navigation

sure of the cross-basin channels. Closure of the Atchafalaya River - Main Channel junction would eliminate, however, the need for closure of the West Freshwater Distribution Channel since the latter is a distributary of the Atchafalaya River. Navigational access to the Main Channel for incidental activities would be maintained via the existing western route (Figure 5-1). On the other hand, a new vantage point for regular surveying and maintenance operations along the Main Channel would have to be established as a substitute for the present Butte La Rose Landing and to accommodate recreational activities related to the Main Channel. A logical site for such a new landing would be the intersection of Interstate Highway 10 and the Main Channel.

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